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ferent points. Besides the introductory chapters there are the following headings: General Polarized Oscillations, Interference, Huyghen's Principle, Diffraction, Reflection and Refraction at Isotropic Media, and Propagation of Waves through Crystalline Media. In accordance with the general plan mentioned above, no application of theory to instrumental methods is anywhere given. The large amount of ground left for the second part will, if covered in the same detail, make the treatise as a whole the most ambitious and extensive available in English; and while one can not but admire the power and generality of treatment, to the present reviewer, at least, the book seems greatly handicapped by the attitude already referred to and by a certain rather formidable style.

C. E. M.

MADISON, WIS.,
February, 1906.

Catalogue of the Crosby Brown Collection of Musical Instruments of all Nations. IV., Historical Groups. Gallery 39. New York, The Metropolitan Museum of Art. 1905. Pp. xvii + 168; pl. 12, partly folded.

Earlier parts of the catalogue of this rich collection have been reviewed in SCIENCE. The present volume deals with a fifth gallery opened to the public in 1903. The exhibits in it include: (1) a number of prehistoric instruments, originals or copies; (2) a dozen plaster casts of ancient sculptures showing musical instruments; (3) about 230 drawings of instruments used from the earliest times to the thirteenth century A.D., grouped by types and countries to the east or west of Assyria and Egypt; (4) the leading European instruments with their kindred forms in different countries; (5) details of the construction of the violin, flute, cornet, piano and organ; (6) some keyboard instruments, in part recently acquired, showing especially the development of the piano and several of the earliest American pianos.

The mere enumeration of these groups shows that a new stage has been reached in the history of the great collection. Begun merely with the purpose of decorating a music

room, it soon outgrew private walls and came to include nearly every existing kind of instrument that could be obtained. These were classified, catalogued and described. But the collection lacked specimens of the almost unobtainable instruments of ancient and prehistoric times. This gap is now at least partly filled by the many reproductions and drawings. These latter are of great variety, value and interest; the list of books from which figures are copied is a long one; but too many of the 'authorities' get their illustrations at second-hand instead of first-hand, and copies are rarely accurate; the addition or omission of a line by a draftsman who does not thoroughly understand the instrument not infrequently makes the figure unintelligible or misleading. It is unfortunate that the most easily accessible references are the voluminous and rather antiquated books by the uncritical Carl Engel.

A peculiarly interesting feature is the collection of partly-finished instruments of the five kinds named above, with the tools and specimens of materials used in their manufacture; all the parts are carefully named and the exhibit is accompanied by technical descriptions. All this recalls the remarkably full and accurate descriptions of all arts and industries in the great French Encyclopédie before the Revolution. The models of a tubular pneumatic and an electro-pneumatic action for organs are very perfect and illustrative.

This volume impresses the reader as marking an advance over the earlier ones; there was here opportunity for a more comprehensive grouping of instruments illustrating the long story of musical development, and the opportunity has been well used; therefore, much of the book is as useful to the reader anywhere as to the visitor. The copious bibliography and several full indexes are noteworthy. Acknowledgments are again made to Mr. Galpin, of England, and for the first time to Miss Fannie Morris, who has done a large part of the work on all the catalogues.

This series of catalogues being now, we believe, completed, one looks forward with interest to see in what way the collection will be utilized by the donor, the authorities or

independent students for the advancement of knowledge and the sympathetic study of man's instruments of musical expression. It is already clear that the problems are not so simple as would appear from the ordinary presentation of Helmholtz's theories; for the materials accumulated in the forty years since he wrote require an ampler framework.

CHARLES KARSON WEAD.

SCIENTIFIC JOURNALS AND ARTICLES.

THE February number (volume 12, number 5) of the *Bulletin of the American Mathematical Society* contains the following articles: Report of the Twelfth Annual Meeting of the American Mathematical Society, by F. N. Cole; 'Note on Certain Groups of Transformations of the Plane into Itself,' by Peter Field; Report of the Meran Meeting of the Deutsche Mathematiker-Vereinigung, by E. A. Miller and Elijah Swift; 'The Present and the Future of Mathematical Physics,' by Henri Poincaré (translated by J. W. Young); Shorter Notices (Königsberger's Jacobi *Festschrift*, by James Pierpont; Schlömilch's *Uebungsbuch zum Studium der höheren Analysis*, by James Pierpont; Hedrick-Goursat's Course in Mathematical Analysis, by Wm. F. Osgood; Willis's Elementary Modern Geometry, Part I., by Virgil Snyder; Classen's *Zwölf Vorlesungen über die Natur des Lichtes*, by E. B. Wilson); Notes; New Publications.

The March number of the *Bulletin* contains: Report of the December Meeting of the Chicago Section of the American Mathematical Society, by T. F. Holgate; 'The Groups Containing Thirteen Operators of Order Two,' by G. A. Miller; Review of Huntington's Types of Serial Order, by Oswald Veblen; Review of Fine's College Algebra, by E. V. Huntington; Review of Freund's Translation of Ball's History of Mathematics, by D. E. Smith; Shorter Notices (*Abhandlungen zur Geschichte der mathematischen Wissenschaften*, by D. E. Smith; Bucherer's *Elemente der Vektor-Analyse*, by E. B. Wilson; *Annuaire du Bureau des Longitudes pour l'An 1906*, by E. W. Brown; Jordan's Astronomical and Historical Chronology, by E. W. Brown); Notes; New Publications.

The Museums Journal of Great Britain for January has for its leading article a paper on 'The Relation of Provincial Museums to Local Institutions,' by John Minto. While the subject is one that appeals to foreign museums rather than to those of this country, yet the article itself is a most excellent essay on the objects of museums and fairly teems with good things. Most museum officials will appreciate such sayings as "Most of our museums, I regret to say, are lamentably deficient in storage accommodation." "Each group of objects (in a teaching collection) should have in view the teaching of some definite lesson." "There are many instances of museums which, having secured the services of local enthusiasts for a period of years * * * have on the severance of the connection fallen upon evil days," and (this should be in large type) "It will take years to do away with the idea of museums still entertained by many * * *, as storehouses of curiosities. * * *" The many notes show that, aside from the Manchester Museum, there seems to be a liberal and growing support of such institutions in England. As for the Manchester Museum, those who know the extent and high standard of its work will be surprised to learn from its report the mere pittance that it receives for its support. In discussing Dr. Holland's recent article on 'Museums and Outside Experts,' the comment is made: "Needless to say, all type-specimens should invariably be returned to the museum, but it is usual to allow the expert to retain a selection of duplicate specimens. In our opinion, however, nothing should be handed over to the expert until all the material has been returned by him to the museum."

A JOURNAL entitled *Annales de Paléontologie* has been established at Paris, under the editorship of M. Boule, professor in the Museum of Natural History.

SOCIETIES AND ACADEMIES.

THE NEW YORK ACADEMY OF SCIENCES. SECTION OF GEOLOGY AND MINERALOGY.

Meeting of October 9, 1905.—In the absence of Vice-President Hovey, President J. F.